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DENTIFRICE CONTAINING IRIDESCENT OR PEARLESCENT
FLAKES OF MOTHER OF PEARL OR MICA

(70)

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ABSTRACT OF THE DISCLOSURE

A transparent dentifrice is made sparkling, iridescent or pearlescent without sacrifice of transparency, or if desired with the formation of opacity, by incorporating into the dentifrice relatively small amounts of iridescent or pearlescent flakes, such as mother of pearl flakes or mica flakes coated with titanium dioxide.

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BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to the discovery that transparent dentifrices may be modified with respect to appearance by imparting to the dentifrice a sparkling, iridescent or pearlescent character without loss of transparency, accomplished by incorporating into the dentifrice certain substances described more fully hereinbelow.

The use of transparent or translucent dentifrices
10 and the esthetic appeal thereof to the consumer have been
well established. The dentifrices of the present invention
have enhanced consumer appeal, being not only transparent but
having in addition a bright, sparkling pleasant sheen, or an
overall pearlescent appearance.

15 The Prior Art

Transparent or translucent dentifrices are well known having been described, for example, in U.S. Patent No. 2,975,102, French Patent No. 801,455, Spanish Patent No. 326,564 and Belgium Patent No. 586,645. In one such description a clear jelly-like



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transparent dentifrice comprises as a swelling agent a mixture of water soluble acrylic resins. This dentifrice however is free of any solid materials such as particulate cleaning or polishing agents. In view of the absence of such solid particulate materials, the degree of cleansing is inadequate.

More recently there has been issued U.S. Patent No. 3,538,230 relating to transparent dentifrices containing silica xerogels as cleaning and polishing agents. Such transparent dentifrices have good cleaning power.

10 It is known to impart unusual optical effects to
products such as packaging materials, cosmetics, and other
manufactured goods by the incorporation therein of substances
which have nacreous or pearlescent properties. For example,
such substances have been used in polyethylene packages for
15 toiletries to impart sparkle, and to provide sparkling or
pearlescent properties to nail polish.

SUMMARY OF THE INVENTION

It has been found that transparent or translucent dentifrices provide the basis for the manufacture of dentifrices with a sparkling, iridescent or pearlescent sheen by incorporating into the dentifrice composition certain substances in flake form as described hereinbelow.

Accordingly, it is an object of the present invention to provide an esthetically pleasing dentifrice having a sparkling, iridescent or pearlescent sheen.

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It is another object of the invention to provide a process for imparting a sparkling, iridescent or pearlescent sheen to a transparent or translucent dentifrice composition.

In a preferred embodiment of the invention there is
5 provided a sparkling, iridescent or pearlescent toothpaste
wherein the essential polishing and cleansing ingredient is
a silica xerogel.

It is well known in the art that transparent or translucent toothpastes are packed in the form of a gel, the more commercially successful products containing a compatible particulate cleaning and polishing agent.

The toothpastes of the present invention may be based on any of the known transparent products. Of particular interest are those described in the aforementioned U.S. Patent No. 3,538,230. The toothpastes generally contain liquids and solids. The liquid portion comprises water usually with a humectant such as glycerol, sorbitol, propylene glycol, polyethylene glycol of molecular weight about 400 and other polyhydric alcohols, and mixtures of these humectants. The preferred humectants are glycerol and sorbitol. The total liquid content is generally about 20% to about 90% by weight of the toothpaste. The paste may contain 0% to about 80% by weight of glycerol, 0% to about 80% by weight, preferably about 20% to about 80% by weight, of sorbitol and about 5% to about 80% by weight of water.

The toothpastes contain a gelling or bodying agent such as the natural and synthetic gums, Irish Moss, gum Tragacanth, starch, gum Karaya, alkali metal (e.g. Li, K)

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or Na) carboxymethylcellulose and hydroxymethyl carboxymethylcellulose, polyvinyl pyrrolidone, colloidal carboxymethyl polymers such as those sold under the trademark Carbopol 934 and 940, hydroxyethylcellulose, Indian gum, acacia gums, agar agar, locust bean gum and pectin or inorganic thickeners such as colloidal silica. These bodying agents may be present in an amount from about 0.10% to about 20%, preferably about 0.10% to about 10%, and typically about 0.5% to about 5%, by weight of the toothpaste.

The toothpastes of the present invention may be made by any method well known to those skilled in the art. For example, a binding agent or gelling agent such as sodium carboxymethylcellulose and a preservative such as sodium benzoate is dispersed in a non-aqueous liquid medium which comprises the humectant system. Any aqueous materials such as water or an aqueous 70% sorbitol solution are then added. The dispersion is then heated to a temperature of about 40° to about 65°C and mixed to uniform consistency in the form of paste, gel or cream. Next to be added are the polishing or cleansing ingredient and the surface-active agent or detergent such as sodium lauryl sulfate. The product is then cooled preferably to about room temperature and the flavor is then added and thoroughly mixed into the paste. The sparkle-producing, iridescent or pearlescent agent is then added and dispersed throughout the toothpaste. Care should be taken to

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minimize breakdown of the agent. Chloroform, if a part of the formulation, may be incorporated after cooling. As a final step in the preparation, the product is deaerated. Chloroform aids in the deaeration step and the deaeration may be accomplished in the manner described in U.S. Patent No. 3,551,559.

The transparency or translucency of the toothpastes of this invention can be affected by the choice of ingredients. For example, as set forth in the aforementioned U.S. Patent No. 3,538,230, insoluble flavoring materials tend to decrease translucency and appropriate changes in the humectant system to enhance solubility would simultaneously enhance translucency.

The polishing agent ingredient of the present tooth-
15 pastes are those which do not destroy transparency. The
preferred polishing agent is a porous amorphous silica
xerogel having an average particle size of about 1-65 mic-
rons, preferably about 2 to about 20 microns, a surface area
of about 150-700 m^2/g , preferably about 200 to 450 m^2/g , and
20 a bulk density of about 0.15-0.30 g/cm^3 . This type of amor-
phous silica xerogel contains a minor amount of water and
is often referred to as a silica gel. Preferred grades of
amorphous silica xerogel polishing agent are for example

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Syloid 72 and Syloid 74 which are described in "The Davison Family of Syloid Silicas" published by their manufacturer, Grace, Davison Chemical Company. Syloid 72 has an average particle size of about 4 microns, a surface area of about 370 m^2/g , and a bulk density of about 0.177 g/cm^3 . Syloid 74 has an average particle size of about 8 microns, a surface area of about 320 m^2/g , and a bulk density of about 0.6 g/cm^3 . These silica gels may be used singly or in admixture. They are typically employed in amounts of about 5% to about 50%, preferably about 10% to about 20%, of the transparent toothpaste. The maximum particle size in the preferred grades of amorphous silica xerogel polishing agent is desirably below the minimum size of palatability and is typically less than 75 microns.

15 Also suitable is Sylcid 63, a xerogel having an average particle size of about 9 microns, and a surface area of about $675 \text{ m}^2/\text{g.}$

The xerogel is present in sufficient amount to assure effective cleansing of the teeth under normal use conditions, without dependence on other components of the dentifrice. Under some conditions, however, cleansing efficacy can be supplemented by minor amounts of other dentifrice abrasives so long as they do not excessively opacify the paste.

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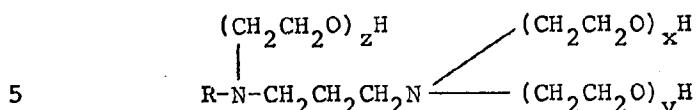
The transparent toothpaste may also contain a surface active agent as a surface tension depressant to assist in achieving thorough and complete dispersion of the compositions throughout the oral cavity, and render the instant compositions more cosmetically acceptable. The surface active agent may be any of the well-known physiologically acceptable organic substances and may be anionic, nonionic, amphotolytic, or cationic. Suitable surface active agents are sodium lauryl sulfate, sodium dodecane sulfonate, acyl taurines, acyl isethionates, the sodium salt of the mono-sulfated monoglyceride of hydrogenated coconut oil fatty acids, alkyl aryl sulfonates such as sodium dodecyl benzenesulfonate, the higher fatty acid esters of 1,2-hydroxy propanesulfonates, the N-acyl sarcosines, etc.

15 Other particularly suitable surface active materials
include nonionic agents such as condensates of sorbitan mono-
stearate with approximately 60 moles of ethylene oxide, con-
densates of ethylene oxide with propylene oxide condensates
of propylene glycol ("Pluronics") and amphoteric agents such
A as quaternized imidazole derivatives, which are available
20 under the trademark "Miranol" such as Miranol C₂M. Cationic
surface active germicides and antibacterial compounds such
as di-isobutylphenoxyethoxyethyl dimethyl benzyl ammonium
chloride, benzyl dimethyl stearyl ammonium chloride, tertiary
25 amines, having one fatty alkyl group (of from 12 to 18 carbon
atoms) and two (poly) oxyethylene groups attached to the

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nitrogen (typically containing a total of from about 3 to about 50 ethenoxy groups per molecule) and salts thereof with acids, and compounds of the structure



where R is a fatty alkyl group containing from about 12 to 18 carbon atoms, and x, y and z total 3 or higher, as well as salts thereof with mineral organic acids, may also be used. It is preferred that the total amount of surface-active agent be about 0.05-5% by weight, preferably about 1-3%, of the dentifrice.

Various other materials may be incorporated in the oral preparation of this invention. Examples thereof are coloring or whitening agents, preservatives, silicones, chlorophyll compounds, ammoniated materials, such as urea, diammonium phosphate and mixtures thereof, and other constituents. Each of these adjuvants may be typically incorporated in the instant toothpastes in amounts up to about 5%.

The toothpaste may also contain antibacterial agents in amount of about 0.01-5%. Typical examples of such agents are guanidines, biguanides and amines such as:

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1-(lauryldimethylammonium)-8-(p-chlorobenzylidimethyl-
ammonium) octane dichloride;

5,6-dichloro-2-guanidinobenzimidazole;

N^1 -p-chlorophenyl- N^5 -laurylbiguanide;

5 5-amino-1,3-bis(2-ethylhexyl)-5-methylhexahydro-
pyrimidine; and their non-toxic acid
addition salts.

Suitable flavoring agents may include oils of spearmint, peppermint, wintergreen, sassafras, clove, sage, eucalyptus, marjoram, cinnamon, lemon and orange, as well as sodium methylsalicylate.

10 Suitable sweetening agents include sucrose, lactose, maltose, sorbitol, sodium cyclamate and saccharine. Flavor and sweetening agent may together comprise from about 0.01 to
15 about 5% or more of the compositions of the invention.

The compositions of the present invention suitably may also contain a fluorine-containing compound having a beneficial effect on the care and hygiene of the oral cavity, e.g., diminution of enamel solubility in acid and protection of the
20 teeth against decay. Examples thereof include sodium fluoride, stannous fluoride, potassium fluoride, potassium stannous fluoride ($SnF_2 \cdot KF$), sodium hexafluorostannate, stannous chlorofluoride, sodium fluorozirconate and sodium monofluorophosphate. These materials, which dissociate or release fluorine-containing
25 ions in water, suitably may be present in an effective but non-toxic amount, usually within the range of about 0.01 to 1% by weight of the water soluble fluorine content thereof.

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In general, the materials used to impart sparkle, iridescence, or pearlescence to dentifrices have certain characteristics in common. They are particulate and have a plate-like structure adaptable for arrangement in parallel 5 layers. Their refractive index is different from that of the supporting medium. They are essentially transparent. Depending on chemical composition, particle size, thickness of the reflecting layer, and uniformity of the reflecting layer, different optical effects can be obtained.

10 The sparkling, iridescent, or pearlescent flakes used in the compositions of the present invention are useful in proportions ranging from about 0.03% to about 5%. It is preferred to use proportions between about 0.1% and about 3%. Proportions from about 0.25% to about 2% are also useful.

15 A suitable iridescent substance is mother of pearl, employed in proportions of about 0.1% to about 5%, basis total dentifrice composition. This is a true nacreous secretion found on the inner surface of oyster shells and made up of non-toxic calcium carbonate in flake form. The mother of pearl 20 flakes refract light into various wave lengths across the color spectrum and their incorporation into a transparent toothpaste results in a multicolored speckled effect without loss of transparency resulting in a pleasing, sparkling product. When the toothpaste of the present invention is extruded from 25 a conventional toothpaste tube onto a toothbrush, the extrudate is typically clear with visible spaced light refracting sparkling

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dots; as the extrudate is moved, relative to the eye of the observer, different dots become visible and the apparent colors of individual dots change. Especially good results have been obtained through the use of mother of pearl flakes of a size which pass through a 30 mesh sieve (corresponding to a particle size of about 590 microns) and retained on a 100 mesh sieve (corresponding to a particle size of about 149 microns), with the predominant portion being larger than 200 microns.

A method for producing mother of pearl flakes comprises
10 grinding oyster shells and mechanically separating the mother of
pearl flakes formed thereby from the balance of the ground material,
as by flotation. Typically the mother of pearl flakes are flat,
smooth-surfaced, and are less than 50 microns thick, for example
10-40 microns. They are oval-shaped in plane view, and made up
15 of numerous thin parallel layers and may have a thickness ranging
from well below 1 micron to about 2 or 3 microns.

Another type of substance which imparts sparkle, iridescence or pearlescence to the product of the invention comprises thin transparent mica flakes coated with a thin layer of titanium dioxide. One type of such flakes comprises platelets having a TiO_2 content of about 17%, an average thickness of less than 1 micron, for example about 0.7% micron, with the longest dimension of most of platelets being less than about 100 microns, for example about 15 to 40 microns, the refractive index of the mica layer being about 1.58 and the refractive index of the TiO_2 layer being about 2.3. When these TiO_2 -coated mica flakes

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are incorporated into transparent toothpastes in the proportion of about 0.05% to about 0.3%, preferably about 0.1% to about 0.3%, and more desirably about 0.1% to about 0.2%, and the toothpaste extruded onto a toothbrush, the toothpaste has a sparkling appearance, with the individual reflecting and iridescent dots being very small and close together, giving an overall pleasing opaque pearlescent effect. When the TiO_2 -coated mica flakes are incorporated at higher levels, for example about 0.5%-0.6%, or 0.5% to 1% the flakes, if relatively small, tend to lose their individual appearance, and the sparkling effect is slight or non-existent, but instead a pearl-like, overall sheen is observed. Still another, but less desirable, type of iridescent flakes comprises mica flakes carrying a coating of $BiOCl$.

Variations in the iridescent and pearlescent effect can be obtained by varying the particle concentration and by using mixtures of flakes of a variety of types, dimensions, and composition.

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The sparkling, iridescent or pearlescent effect has the greatest appeal in a dentifrice when the dentifrice in which the flakes are dispersed is a transparent toothpaste, but the effect is apparent in dentifrices having other forms, such as creams or powders that are not totally opaque.

5 such as creams or powders that are not totally opaque.

When the flakes are admixed in a transparent paste, in particular when the flakes are mother of pearl having suitable dimensions, in the proportions of about 1.5% to about 3%, a clear dentifrice with visible spaced refracting sparkling dots is evident when a ribbon of the dentifrice 4mm to 8mm thick is extruded onto a toothbrush.

is evident when a ribbon of the dentifrice 4mm to 8mm thick is

An enhanced effect pleasing to the eye is obtained when a polyethylene glycol of molecular weight between about 400 and about 6000 is combined with the iridescent flakes in a compatible transparent toothpaste base. The preferred polyethylene glycols are those having a molecular weight between about 600 and about 6000. A commercially available material having an average molecular weight of 1540 is suitable. The polyethylene glycol in proportions of about 1% to about 15% is useful in conjunction with the iridescent or translucent flakes to enhance the pleasing appearance of the toothpaste. Proportions of about 2% to about 6% are especially preferred. In the preparation of a transparent or translucent toothpaste, the flakes may be slurried with liquid (molten if necessary) polyethylene glycol as a combination to be incorporated with the balance of the

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formula, or these ingredients may be incorporated separately.

Accordingly, a further embodiment of the invention provides in combination, a mixture comprising a polyethylene 'glycol having an average molecular weight of about 400 to about 6000 and iridescent or pearlescent flakes as described herein, there being in the mixture about 0.005 part to about 5 parts by weight of flakes for each part by weight of polyethylene glycol.

10 The invention may be more fully understood by reference to the following Examples, which illustrate the invention but are not to be considered as limiting the scope thereof.

In the following Examples, the dentifrices are prepared by the method hereinabove described. In Examples 1-7, the silica aerogel component used is Syloid 244, having a mean particle diameter of about 3 microns. The silica xerogel component is Syloid 63, a synthetic, amorphous, porous silica having a mean particle diameter of about 4 to about 10 microns. "Syloid 244" and "Syloid 63" are trademarks of the Davison Chemical Division of W. R. Grace and Co.

The Timica and Flamenco line of pigments as used in the compositions of Examples 1-18 shown below consists of nacreous pigments which are mica flakes coated with titanium dioxide. The composition and particle size distribution of the types employed herein are described in the individual examples below. "Timica" and "Flamenco" are trademarks of the Mearl Corporation.

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The detergent referred to in the Examples below is sodium lauryl sulfate.

EXAMPLE 1

A toothpaste is prepared having the following

5 composition:

	<u>Ingredient</u>	<u>% By Weight</u>
	Silica aerogel	8.00
	Silica xerogel	14.00
	(a) Mica Flakes Coated with TiO ₂	0.25
10	Flavor	2.00
	Detergent with Glycerin (21% detergent)	7.00
	(b) Humectant Mixture	to 100.00

15 (a) Timica Silkwhite - Contains about 35% TiO₂. The longest dimension of most platelets is 2-20 microns. Thickness of particles is about 0.3 micron.

(b) Composition of humectant mixture:

	<u>% By Weight</u>	
	Glycerin	22.26
	Sorbitol (70% Solution)	68.87
20	Polyethylene Glycol 1540 (mw = 1540)	7.26
	Carboxymethylcellulose 9M	0.44
	Saccharin	0.29
	Sodium Benzoate	0.12
	Colorants and Water	to 100.00

25 The product is packed in tubes. When extruded onto a toothbrush, the product is seen as a translucent gel with a multiplicity of fine, sparkling particles substantially uniformly distributed therethrough.

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In Examples 2, 3, and 4 below varieties and levels of mica flakes coated with TiO_2 differing from the flakes used in Example 1 are employed in the composition of Example 1. The products of Examples 2 and 3 exhibit slightly more sparkle than does the product of Example 1. A more silvery effect is noted in the product of Example 4.

The flakes employed and their proportions in Examples 2, 3, and 4 are set forth below.

10	<u>Example</u>	<u>% By Weight</u>	<u>Name</u>	<u>Approx. TiO₂ Content</u>	<u>Longest Dimension Of Most Platelets</u>	<u>Approx. Average Thickness</u>
	2	0.35	Timica Pearlwhite	23%	5-40 microns	0.5 micron
15	3	0.13	Timica Pearlwhite	23%	5-40 microns	0.5 micron
	4	0.30	Timica Sparkle	17%	15-40 microns	0.7 micron

EXAMPLE 5

20 This product has the composition of Example 4 except that a blue color is imparted thereto by the inclusion of 0.03% blue colorant, and the "Sparkle" flakes are present in a reduced amount, i.e., 0.15%. The relatively large particle size of the mica/TiO₂ flakes imparts a glistening, 25 silvery sparkling effect against a blue background.

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EXAMPLE 6

This product has the following composition:

<u>Ingredient</u>	<u>% By Weight</u>
Silica aerogel	8.00
5 Silica xerogel	14.00
Timica Extra Large Particle Sparkle	0.10
(c) Mica Flakes Coated with TiO ₂	0.40
Opacifier	0.005
Flavor	2.05
10 Detergent in Glycerin (21% detergent)	7.00
(d) Humectant Mixture	to 100.00

A (c) Flamenco BP - Contains about 26% TiO₂. The platelets range in their longest dimension from about 10 to about 35 microns.

(d) Composition of humectant mixture:

	<u>% By Weight</u>
15 Glycerin	22.40
Sorbitol (70% Solution)	69.07
Polyethylene Glycol 1540 (mw = 1540)	7.29
Carboxymethylcellulose 9M	0.44
20 Saccharin	0.29
Sodium Benzoate	0.12
Distilled Water	to 100.00

The product has a milk-white sheen.

* denotes trade mark

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EXAMPLE 7

This composition is a free-flowing, viscous transparent liquid, capable of being dispensed from a squeeze bottle. The product is blue, with a multiplicity of fine, 5 sparkling, discrete particles distributed throughout the liquid. It has excellent cleaning and polishing properties.

<u>Ingredient</u>	<u>% By Weight</u>
Silica aerogel	1.00
Silica xerogel	21.00
10 FD&C Blue No. 1 (1% Solution)	0.10
(e) Mica Flakes Coated with TiO ₂	0.10
Flavor	2.25
Detergent in Glycerin (21% detergent)	8.00
Humectant Mixture as in Example 6	to 100.00

15 (e) Timica Extra Large Particle Sparkle.

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EXAMPLE 8

A toothpaste is prepared having the following composition:

	<u>% By Weight</u>
5 (a) Silica xerogel	21.00
(b) Silica aerogel	4.00
Sodium carboxymethylcellulose	0.60
Saccharin	0.20
Sorbitol (70% aqueous solution)	60.49
10 Polyethylene glycol 1540 (mw = 1540)	4.00
Sodium benzoate	0.08
(c) Mother of pearl flakes	0.10
Colorant (1% solution)	0.53
Flavor	1.25
15 Chloroform	0.75
21% sodium sulfate - 79% glycerol mixture	7.00
	<hr/>
	100.00

(a) Average particle size 4.4 microns.

20 (b) Syloid 244, a trademark of the Davison Chemical Division of W.R. Grace and Co. The silica has a mean particle diameter of about 2-10 microns.

(c) These flakes are retained on a 100-mesh sieve (149 microns) and pass through a 30-mesh sieve (590 microns). Their
20 average thickness is 40 microns.

The product is a transparent toothpaste having excellent cleansing and polishing properties. The discrete iridescent particles of mother of pearl suspended in the dentifrice add a pleasing esthetic appearance.

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EXAMPLE 9

A toothpaste is prepared having the following composition:

		<u>% By Weight</u>
5	(a) Silica aerogel	5.00
	(b) Silica xerogel	15.00
	Sodium carboxymethylcellulose	0.60
	Saccharin	0.20
	Sorbitol (70% aqueous solution)	59.69
10	Polyethylene glycol 1540	5.00
	Sodium benzoate	0.08
	(c) Mother of pearl flakes	5.00
	Colorant (1% solution)	0.53
	21% sodium lauryl sulfate-79% glycerol mixture	7.00
15	Flavor	1.15
	Chloroform	<u>0.75</u>
		100.00

(a) average particle size 8.6 microns.

(b) average particle size 6.3 microns.

30 (c) as described in Example 8.

The product is a transparent toothpaste modified

in appearance by the presence of a multiplicity of iridescent dots. The toothpaste has excellent cleansing and polishing power.

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EXAMPLE 10

A dentifrice is prepared having the following composition:

		<u>% By Weight</u>
5	(a) Silica xerogel	27.00
	FD&C Blue No. 1 (1% solution)	0.10
	(b) Mica flakes coated with TiO ₂	0.10
	Flavor	1.25
10	21% sodium lauryl sulfate-79% glycerol mixture	4.00
	Na ₂ HPO ₄	0.20
	Ethanol (190 proof)	1.00
	(c) Humectant mixture	<u>66.35</u>
		100.00

15 (a) Syloid 63, a xerogel defined hereinabove.

(b) Timica Extra Large Particle Sparkle.

(c) as in Example 7.

The product is a free-flowing viscous transparent liquid, slightly less viscous than the product of Example 7, capable of being dispensed from a squeeze bottle. It is not distinguishable from the product of Example 7 in appearance. It has excellent cleaning and polishing properties.

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EXAMPLE 11

A dentifrice is prepared having the following composition:

	<u>% By Weight</u>
5 (a) Silica xerogel	20.00
Sodium carboxymethylcellulose	0.25
(b) Mica flakes coated with TiO ₂	0.30
Saccharin	0.20
Sorbitol (70% aqueous solution)	65.92
10 Sodium benzoate	0.08
Flavor	1.25
21% sodium lauryl sulfate-79% glycerol mixture	7.00
Polyethylene glycol 1540	<u>5.00</u>
15	100.00

(a) average particle size 11 microns.

(b) Timica Iridescent Red Flakes.

The product is a transparent toothpaste having iridescent flakes dispersed substantially uniformly therein.

20 It has excellent cleansing and polishing properties.

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EXAMPLE 12

A dentifrice is prepared having the following composition:

	% By Weight
5 (a) Silica xerogel	18.00
(b) Silica aerogel	3.50
Sodium carboxymethylcellulose	0.35
Glycerol	25.00
Sorbitol (70% aqueous solution)	40.00
10 Sodium lauryl sulfate	2.00
(c) Mother of pearl flakes	2.00
Blue colorant (1% solution)	0.10
Sodium benzoate	0.08
Flavor	1.57
15 Water	<u>7.40</u>
	100.00

(a) Syloid 72, having a mean particle diameter of 4 microns.

(b) Sylloid 244, having a mean particle diameter of about 3 microns.

(c) size between 40 and 100 mesh.

20 The product is a transparent, sparkling toothpaste.

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EXAMPLE 13

The preferred products of the present invention are transparent, sparkling, or iridescent dentifrices comprising about 5% to about 50% of a silica xerogel having an average 5 particle diameter of about 2 to about 20 microns, about 0.2% to about 1% of sodium carboxymethylcellulose, about 0.15% to about 0.25% of saccharin, about 25% to about 65% of sorbitol, about 0.001% to about 0.01% of a dye, about 1% to about 3% of a flavoring agent, about 5% to about 9% of a mixture of 21% 10 sodium lauryl sulfate-79% glycerol, about 0.1% to about 5% of iridescent flakes selected from the group of mother of pearl flakes and mica flakes coated with TiO_2 or $BiOCl$, about 1% to about 15% of polyethylene glycol having a molecular weight of about 400 to about 6000, about 0.06 to about 0.10% 15 sodium benzoate, 0 to about 1% ethyl alcohol, and the balance substantially water, said percentages being the percentages of active constituents on the basis of the whole composition.

Having thus described the invention, many modifications within the spirit thereof will occur to those skilled in the art and the invention is to be limited only within the scope of the appended claims.

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THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. An oral dentifrice containing from about 0.03 to about 5 percent by weight of non-toxic iridescent or pearlescent mother of pearl or coated mica flakes having a plate-like structure adaptable for arrangement in parallel layers, the flakes have a particle size of less than about 590 microns and from about 1 to about 15 percent by weight of a polyethylene glycol having a molecular weight in the range of from about 400 to about 6,000.
2. An oral dentifrice as claimed in claim 1, wherein the ratio of iridescent or pearlescent flakes to polyethylene glycol is from about 0.005:1 to about 5:1.
3. An oral dentifrice as claimed in claim 2, wherein the iridescent or pearlescent flakes are comprised of mother of pearl having a particle size in the range of from about 149 to about 590 microns.
4. An oral dentifrice as claimed in claim 2, wherein the iridescent or pearlescent flakes are comprised of coated mica flakes having a particle size wherein their longest dimension is less than about 100 microns.
5. An oral dentifrice as claimed in claim 2, wherein the flakes consist of mica carrying layers of TiO_2 or $BiOCl$.

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6. An oral dentifrice as claimed in claim 2, wherein the polyethylene glycol has a molecular weight in the range of from about 600 to about 6,000 and is present in the dentifrice in an amount of from about 2 to about 6 percent by weight.

7. An oral dentifrice as claimed in claim 2, wherein the dentifrice is a translucent toothpaste.

8. An oral dentifrice as claimed in claim 2, wherein the dentifrice is a transparent toothpaste.

9. An oral dentifrice as claimed in claim 1, wherein said polyethylene glycol has an average molecular weight of about 400 to about 6,000 and said flakes are mother of pearl flakes.

10. An oral dentifrice as claimed in claim 1, wherein said polyethylene glycol has an average molecular weight of about 400 to about 6,000 and said flakes are mica flakes carrying layers of TiO_2 or $BiOCl$.

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11. A transparent, iridescent dentifrice comprising about 5 percent to about 50 percent of a silica xerogel having an average particle diameter of about 2 to about 20 microns, about 0.2 percent to about 1 percent of sodium carboxymethyl-cellulose, about 0.15 percent to about 0.25 percent of saccharin, about 25 percent to about 65 percent of sorbitol, about 0.001 percent to about 0.01 percent of a dye, about 1 percent to about 3 percent of a flavouring agent, about 5 percent to about 9 percent of a mixture of 21 percent sodium lauryl sulphate-79 percent glycerol, about 0.1 percent to about 5 percent of iridescent flakes selected from the group of mother of pearl flakes and mica flakes coated with TiO_2 or $BiOCl$, about 1 percent to about 15 percent of polyethylene glycol having a molecular weight of about 400 to about 6,000, about 0.06 to about 0.10 percent sodium benzoate, 0 to about 1 percent ethyl alcohol, and the balance substantially water, said percentages being the percentages of active constituents on the basis of the whole composition.

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SUBSTITUTE

REPLACEMENT

SECTION is not Present

Cette Section est Absente